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ENGINEERING DATA TRANSMITTAL

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		Safety									
		Env.									

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Data Validation Report for the 100-HR-1 Operable Unit H-2 Septic Tank Samples

3. Number

WHC-SD-EN-TI-080

4. Rev No.

0

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6. Author

Name: J. M. Ayres

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Signature

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7. Abstract

2/24/93 N. Vols

WHC, 1993, *Data Validation Report for the 100-HR-1 Operable Unit H-2 Septic Tank Samples*, WHC-SD-EN-TI-080, Rev. 0, prepared by A.T. Kearney, Inc., for Westinghouse Hanford Company, Richland, Washington.

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10. RELEASE STAMP

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9. Impact Level 3Q

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ACRONYMS

%D	Percent difference
AA	Atomic absorption
BFB	Bromofluorobenzene
BNA	Base/neutral and acid (equivalent to semivolatiles)
CCV	Continuing calibration verification
CLP	Contract Laboratory Program
CRDL	Contract required detection limit
CRQL	Contract required quantitation limit
DBC	Dibutylchloroendate
DFTPP	Decafluorotriphenylphosphine
DQO	Data quality objectives
EPA	U.S. Environmental Protection Agency
GC/MS	Gas chromatography/mass spectrometry
GC	Gas chromatography
GFAA	Graphite furnace atomic absorption
GPC	Gel permeation chromatography
ICP	Inductively coupled plasma emission spectrometry
ICS	ICP interference check sample
ICV	Initial calibration verification
IDL	Instrument detection limit
MSA	Method of standard addition
MS/MSD	Matrix spike/matrix spike duplicate
PCB	Polychlorinated biphenyl
PEM	Performance evaluation mixture
QA	Quality assurance
QC	Quality control
RF	Response factor
RIC	Reconstructed ion chromatogram
RPD	Relative percent difference
RRF	Relative response factor
RRT	Relative retention time
RSD	Relative standard deviation
RT	Retention time
SDG	Sample delivery group
SOW	Statement of work
TAL	Target analyte list
TCL	Target compound list
TIC	Tentatively identified compounds
TOC	Total organic carbon
TOX	Total organic halides
VOC	Volatile organic compounds

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1.0 INTRODUCTION

Data from the chemical analysis of seven samples from the 100-HR-1 Operable Unit H-2 Septic Tank Investigation and their related quality assurance samples were reviewed and validated. The validation was performed to verify that data quality objectives were met for reported sample results and to support decisions regarding remedial actions performed on site. The samples were analyzed by Thermo-Analytic Laboratories (TMA) using U.S. Environmental Protection Agency (EPA) CLP protocols.

Sample analyses included:

- Volatile organics
- Inorganics
- General chemical parameters.

SDG Package No.	Matrix	No. of Samples Analyzed	Parameters
B00ZM6	Sludge	2	VOC, Inorganics, Wet chem
B01605	Water	5	VOC, Inorganics, Wet chem

Seven samples were analyzed for radiochemical parameters by TMA. Analytical protocols specified in the *Westinghouse Hanford Company Statement of Work for Nonradioactive Inorganic/Organic and Radiochemical Analytical Services* were used. Sample analyses included the following:

- Gross alpha and gross beta determination
- Alpha spectroscopy
- Gamma spectroscopy
- Strontium-90
- Nickel-63
- Technetium-99
- Carbon-14
- Tritium.

SDG Package No.	Matrix	No. of Samples Analyzed	Parameters
B00ZM6	Sludge	2	Radiochemical
B01605	Water	5	Radiochemical

Data quality was reviewed and analytical results validated using Westinghouse Hanford Company (Westinghouse Hanford) procedures and related EPA CLP protocols and guidelines. Data were qualified based upon their quality and the guidance provided by these sources. In instances where the two protocols differed, the Westinghouse Hanford guidelines were followed.

The report is broken down into sections for each chemical analysis and radiochemical analysis type. Each section addresses the data package completeness, holding time adherence, instrument calibration and tuning acceptability, blank results, accuracy, precision, system performance, as well as the compound identification and quantitation. In addition, each section has an overall assessment and summary for the data packages reviewed. Detailed backup information is provided to the reader by SDG No. and sample number. For each SDG, a matrix of chemical analysis per sample number is presented, as well as data qualification summaries.

The radiochemical data summary tables can be found following Section 12.0.

Laboratory and data validation personnel added qualifiers to the reported data based on specified data quality objectives. The data reporting qualifiers are summarized as follows:

- U - Indicates the analyte was analyzed for and not detected. The value reported is the sample quantitation limit corrected for dilutions and moisture content. It should be noted that the sample quantitation limit may be higher or lower than the contract or method required detection limit, depending on instrumentation, matrix and concentration factors.
- J - Indicates the analyte was analyzed for and detected. However, the associated value is considered to be an estimate due to identified QC deficiencies. Data flagged with a "J" may be usable for decision making purposes, depending upon the DQOs of the project. Laboratories qualify all reported organic detects below CRQL with a "J" per the CLP procedures.

- UJ - Indicates the analyte was analyzed for and not detected. However, the associated detection limit is considered to be an estimate due to identified QC deficiencies. Detection limits flagged with a "UJ" may be usable for decision making purposes, depending upon the DQOs of the project.
- JN - Indicates the analyte was analyzed for and there is presumptive evidence of that the compound is present. The concentration reported is considered an estimate which should be used for informational purposes only.
- E - Indicates the analyte was analyzed for and detected at a concentration outside of the calibration range of the instrument. All reported concentrations flagged with an "E" are estimates which may contain significant error.
- R - Indicates the analyte was analyzed for and due to a significant QC deficiency, the data is deemed unusable. Analytic results flagged "R" are invalid and provide no information as to whether or not the analyte is present.

The results of data validation performed for the 100-HR-1 Operable Unit Remedial Investigation are contained in the tables following each of the chapters in this report.

Several general quality trends which resulted in data qualification were observed. These included:

- Surrogate recoveries and internal standard areas for the volatile analysis of the samples in SDG No. B00ZM6 were outside QC limits, apparently due to matrix interferences. The associated results were qualified accordingly.
- The volatile method blanks associated with SDG No. B00ZM6 were of a different matrix than the samples, resulting in the rejection of all associated data.
- Mercury holding times were exceeded in all samples in both data packages. Then associated results were qualified as estimates.
- The pH holding times were grossly exceeded for all samples in SDG No. B00ZM6. The associated results were rejected.
- All pH and conductivity results were rejected due to incomplete raw data.
- All gross alpha, gross beta, alpha spectroscopy, Carbon-14 and Technetium-99 results were rejected due to incomplete instrument calibration data.

- All gamma scan results were flagged as estimates due to incomplete spike information.

In general, the protocol-specific QA/QC requirements were met for the samples analyzed in this investigation with the exceptions noted above and discussed in detail in the chapters to follow. All requested analyses were performed.

With the exceptions noted above, the protocol-specific data quality objectives in terms of precision, accuracy, completeness, representativeness, and comparability have been met.

9 3 1 2 9 7 0 0 0 9

WELL AND SAMPLE INFORMATION				SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	VOLATILES
1607-H-2	B00ZM6	Sludge	6/25/91	2-6
	B00ZM7R	Sludge	6/25/91	2-6
	B01605	Sludge	6/25/91	2-9
	B01606	Sludge	6/25/91	2-9
	B01607	Sludge	6/25/91	2-9
	B01608	Sludge	6/25/91	2-9
	B01609	Sludge	6/25/91	2-9

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2.0 VOLATILE ORGANIC DATA VALIDATION

2.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted and found to be complete:

B00ZM6

B01605

2.2 HOLDING TIMES

Analytical holding times were assessed to ascertain whether the Westinghouse holding time requirements for volatile organic analyses were met by the laboratory. The Westinghouse holding time requirements for volatile organic analyses are as follows: soil samples must be analyzed within 14 days of the date of sample collection; aqueous samples must be analyzed within seven days of the date of sample collection, if unpreserved, or within 14 days if preserved; and all samples must be shipped on ice to the laboratory and stored at 4°C until analysis.

All analyses were performed within the required holding times.

2.3 INSTRUMENT CALIBRATION AND TUNING

Instrument calibration is performed to establish that the GC/MS instrument is capable of producing acceptable and reliable analytical data over a range of concentrations. The initial and continuing calibrations are to be performed according to CLP protocols. An initial multipoint calibration is performed prior to sample analysis to establish the linear range of the GC/MS instrument. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All initial and continuing calibration results were acceptable.

2.3.1 GC/MS Tuning/Instrument Performance Check

Tuning is performed to ensure that mass resolution, identification, and, to some degree, sensitivity of the GC/MS instrument have been established. When analyzing for volatile

organics, instrument tuning is performed with BFB. Instrument tuning must be performed prior to the analysis of either standards or samples and must meet the criteria for acceptable GC/MS instrument tuning using BFB as outlined in Westinghouse Hanford (WHC 1991) and in EPA (EPA 1988a and 1988b) criteria.

The original data were checked for transcription and calculation errors to verify that tuning criteria were met. Prior to calibration and sample analysis, all tuning criteria were met.

All GC/MS tuning data is acceptable.

2.4 BLANKS

Method blank and field blank analyses are performed to determine the extent of laboratory or field contamination of samples. No contaminants should be present in the blanks. Analytical results for analytes present in any sample at less than 5 times the concentration of that analyte found in associated blanks should be qualified as non-detects; common laboratory contaminants present at less than 10 times the concentration of that analyte are qualified as non-detects.

SDG No. B00ZM6 contained two soil samples with high moisture content. The method blanks associated with these samples were water, not soil samples. The laboratory provided no explanation or additional information to justify this change of procedure. Therefore, all volatile analyses results for the samples in SDG No. B00ZM6 have been rejected ("R") and should not be used for any purpose.

All laboratory blank results were acceptable for SDG No. B01605.

2.5 ACCURACY

Accuracy was assessed by evaluating the recoveries of stable isotopically labeled surrogate compounds added to all samples and blanks, and by the analysis of a representative sample which was spiked with a variety of volatile organic compounds.

2.5.1 Matrix Spike Recovery

Matrix spike compounds are added to a sample which is representative of the sample delivery group. Matrix spike analyses are performed in duplicate using five compounds and should be within the established quality control limits (EPA 1988b). The matrix spike analyses estimate how much the target

compounds are interfered with, either positively or negatively, by the sample matrix.

All matrix spike/matrix spike duplicate results were acceptable.

2.5.2 Surrogate Recovery

Matrix-specific surrogate compound recovery control windows have been established by the EPA CLP program. When a surrogate compound recovery is out of the control window, all positively identified target compounds associated with the unacceptable surrogate recoveries are qualified as estimates (J). Undetected compounds are qualified as having an estimated detection limit (UJ).

Recovery results for surrogate compounds toluene-d8 and bromofluorobenzene were outside of the QC limits for both samples in SDG No. B00ZM6, apparently due to matrix interferences. Since all results from this data packages were rejected due to method blank irregularities, no further action was required.

All other surrogate results were acceptable.

2.6 PRECISION

Precision is expressed by the relative percent difference (RPD) between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Field precision is measured by analyzing duplicate samples taken in the field.

All matrix spike/matrix spike duplicate RPD results were acceptable.

2.7 INTERNAL STANDARDS PERFORMANCE

Internal standard performance was assessed to determine whether abrupt changes in instrument response and sensitivity occurred that may have affected the reliability of the analytical data. The response (area or height) of the internal standards must not vary by more than 100 percent or -50 percent from the response of the internal standard that was used to calculate the upper and lower bounds. The upper and lower bounds define the range for acceptable internal standard response (area/height) for the sample analyses.

All internal standard areas were below the QC limits for sample numbers B00ZM6 and B00ZM7 in SDG No. B00ZM6. The internal

standard results for sample number B00ZM7 rerun (B00ZM7R) were, however, within QC limits. Therefore, the reanalysis results have been reported. Since all results from this data package were rejected due to method blank irregularities, no further action was required.

All other internal standard recovery results were acceptable.

2.8 COMPOUND IDENTIFICATION AND QUANTITATION

The identity of detected compounds was confirmed to investigate the possibility of false positives. The confirmation of compound identification during the quality assurance review focuses on false positives because only mass spectra for positive identifications are submitted. However, target compounds that are reported as undetected are also evaluated to investigate the possibility of false negatives. Confirmation of possible false negatives is addressed by reviewing other factors relating to analytical sensitivity (e.g., relative response factors, detection limits, linearity, analytical recovery).

Compound quantitations and reported detection limits were recalculated for a minimum of 20 percent of the samples in each case to verify that they are accurate and are consistent with CLP requirements.

Below the CRQL, instrument precision becomes more variable as the instrument detection limit is approached. Therefore, the concentration of any compound that was detected below the CRQL was qualified as an estimate (J).

The reported results and quantitation limits were verified as correct in all cases.

2.9 OVERALL ASSESSMENT AND SUMMARY

A thorough review of ongoing data acquisition and instrument performance criteria was made to assess overall GC/MS instrument performance. No changes in instrument performance were noted that would result in the degradation of data quality. No indications of unacceptable instrument performance (i.e., shifts in baseline stability, retention time shifts, extraneous peaks, or sensitivity) were found during the quality assurance review.

In general, the volatile data presented in SDG No. B01605 met the protocol-specified QA/QC requirements. Internal standards and surrogate recovery results were outside QC limits for samples associated with SDG No. B00ZM6. The method blank for this data package were run incorrectly, therefore all associated data for the samples were rejected ("R"). The data is considered

invalid and should not be used for any purpose. All other results are considered to be acceptable and usable for all purposes.

9 3 1 2 9 7 0 0 0 1 5

VOLATILE ORGANIC ANALYSIS, SOIL MATRIX, (ug/Kg)

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Project: WESTINGHOUSE-HANFORD																									
Laboratory: TMA																									
Case		SDG: B00ZM6																							
Sample Number		B00ZM6				B00ZM7R																			
Location		1607-H-2				1607-H-2																			
Remarks																									
Sample Date		6/25/91				6/25/91																			
Analysis Date		07/09/91				07/09/91																			
Volatile Organic Compound	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q				
Chloromethane	10	91	R	45	R																				
Bromomethane	10	91	R	45	R																				
Vinyl Chloride	10	91	R	45	R																				
Chloroethane	10	91	R	45	R																				
Methylene Chloride	10	91	R	45	R																				
Acetone	10	770	R	450	R																				
Carbon Disulfide	10	45	R	23	R																				
1,1-Dichloroethene	10	45	R	23	R																				
1,1-Dichloroethane	10	45	R	23	R																				
1,2-Dichloroethene (total)	10	45	R	23	R																				
Chloroform	10	45	R	23	R																				
1,2-Dichloroethane	10	45	R	23	R																				
2-Butanone	10	91	R	45	R																				
1,1,1-Trichloroethane	10	45	R	23	R																				
Carbon Tetrachloride	10	45	R	23	R																				
Bromodichloromethane	10	91	R	45	R																				
1,2-Dichloropropane	10	45	R	23	R																				
cis-1,3-Dichloropropene	10	45	R	23	R																				
Trichloroethene	10	45	R	23	R																				
Dibromochloromethane	10	45	R	23	R																				
1,1,2-Trichloroethane	10	45	R	23	R																				
Benzene	10	45	R	23	R																				
trans-1,3-Dichloropropene	10	45	R	23	R																				
Bromoform	10	45	R	23	R																				
4-Methyl-2-pentanone	10	91	R	45	R																				
2-Hexanone	10	91	R	45	R																				
Tetrachloroethene	10	45	R	23	R																				
1,1,2,2-Tetrachloroethane	10	45	R	23	R																				
Toluene	10	45	R	23	R																				
Chlorobenzene	10	45	R	23	R																				
Ethylbenzene	10	45	R	23	R																				
Styrene	10	45	R	23	R																				
Xylene (total)	10	45	R	23	R																				

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VOLATILE ORGANIC ANALYSIS, WATER MATRIX, (ug/L)

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Project: WESTINGHOUSE-HANFORD																						
Laboratory: TMA																						
Case		SDG: B01605																				
Sample Number		B01605		B01606		B01607		B01608		B01609												
Location		1607-H-2		1607-H-2		1607-H-2		1607-H-2		1607-H-2												
Remarks																						
Sample Date		06/25/91		06/25/91		06/25/91		06/25/91		06/25/92												
Analysis Date		07/09/91		07/09/91		07/09/91		07/09/91		07/09/92												
Volatile Organic Compound		CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Chloromethane		10	10	U	10	U	10	U	10	U	10	U										
Bromomethane		10	10	U	10	U	10	U	10	U	10	U										
Vinyl Chloride		10	10	U	10	U	10	U	10	U	10	U										
Chloroethane		10	10	U	10	U	10	U	10	U	10	U										
Methylene Chloride		10	10	U	10	U	10	U	10	U	300											
Acetone		10	10	U	10	U	10	U	10	U	10	U										
Carbon Disulfide		10	5	U	5	U	5	U	5	U	5	U										
1,1-Dichloroethene		10	5	U	5	U	5	U	5	U	5	U										
1,1-Dichloroethane		10	5	U	5	U	5	U	5	U	5	U										
1,2-Dichloroethene (total)		10	5	U	5	U	5	U	5	U	5	U										
Chloroform		10	5	U	5	U	5	U	5	U	5	U										
1,2-Dichloroethane		10	5	U	5	U	5	U	5	U	5	U										
2-Butanone		10	10	U	10	U	10	U	10	U	10	U										
1,1,1-Trichloroethane		10	5	U	5	U	5	U	5	U	5	U										
Carbon Tetrachloride		10	5	U	5	U	5	U	5	U	5	U										
Bromodichloromethane		10	10	U	10	U	10	U	10	U	10	U										
1,2-Dichloropropane		10	5	U	5	U	5	U	5	U	5	U										
cis-1,3-Dichloropropene		10	5	U	5	U	5	U	5	U	5	U										
Trichloroethene		10	5	U	5	U	5	U	5	U	5	U										
Dibromochloromethane		10	5	U	5	U	5	U	5	U	5	U										
1,1,2-Trichloroethane		10	5	U	5	U	5	U	5	U	5	U										
Benzene		10	5	U	5	U	5	U	5	U	5	U										
trans-1,3-Dichloropropene		10	5	U	5	U	5	U	5	U	5	U										
Bromoform		10	5	U	5	U	5	U	5	U	5	U										
4-Methyl-2-pentanone		10	10	U	10	U	10	U	10	U	10	U										
2-Hexanone		10	10	U	10	U	10	U	10	U	10	U										
Tetrachloroethene		10	5	U	5	U	5	U	5	U	5	U										
1,1,2,2-Tetrachloroethane		10	5	U	5	U	5	U	5	U	5	U										
Toluene		10	5	U	5	U	5	U	5	U	5	U										
Chlorobenzene		10	5	U	5	U	5	U	5	U	5	U										
Ethylbenzene		10	5	U	5	U	5	U	5	U	5	U										
Styrene		10	5	U	5	U	5	U	5	U	5	U										
Xylene (total)		10	5	U	5	U	5	U	5	U	5	U										

WELL AND SAMPLE INFORMATION				SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	INORGANICS
1607-H-2	B00ZM6	W	6/25/91	3-6
	B00ZM7	W	6/25/91	3-6
	B01605	W	6/25/91	3-9
	B01606	W	6/25/91	3-9
	B01607	W	6/25/91	3-9
	B01608	W	6/25/91	3-9
	B01609	W	6/25/91	3-9

3.0 INORGANIC DATA VALIDATION

3.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted and found to be complete:

B00ZM6

B01605

3.2 HOLDING TIMES

Analytical holding times for ICP metals, GFAA metals, and CVAA mercury analyses were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: samples must be analyzed within twenty-eight days for mercury, 14 days for cyanide, and within six months for all other metals.

The 28 day contract holding time for mercury was not met for any of the samples in either data package. All mercury results were flagged as estimates.

The holding time requirements for all other analytes were met for both data packages.

3.3 INSTRUMENT PERFORMANCE AND CALIBRATIONS

Performance of specific instrument quality assurance and quality control procedures, including deficiencies noted during the quality assurance review, are outlined below.

Three calibration standards and a blank were analyzed for arsenic, selenium, thallium, and lead by GFAA. The correlation coefficient of a least squares linear regression met the requirements for calibration in all cases.

Up to five calibration standards and a blank were analyzed for mercury by CVAA. The correlation coefficient of a least squares linear regression met the requirements for calibration.

At least one standard and a blank were analyzed by ICP for all other elements.

The above calibrations were each immediately verified with an ICV standard and a calibration blank. The ICV was prepared

from a source independent of the calibration standards, at a mid-calibration range concentration. The ICV percent recovery must fall within the control limits of 90 to 110 percent for metals analyzed by ICP and GFAA, and 80 to 120 percent for mercury. Calibration linearity near the detection limit was verified with a standard prepared at a concentration near the CRDL.

The ICVs met the recommended control limits for all samples.

The calibrations were subsequently verified at regular intervals using a CCV standard. The control windows for percent recovery of CCV standards are the same as the ICV windows described above.

The CCVs met the recommended control limits in all cases.

3.3.1 ICP Calibration

An ICS was analyzed at the beginning and end of each ICP sample run to verify the laboratory interelement and background correction factors. Results for the ICS solution must fall within the control limit of ± 20 percent of the true value.

A five-fold serial dilution is required for all elements analyzed by ICP whose concentrations are greater than the linear range. The subsequent concentrations of the reanalysis are compared with the original analysis. The concentration values must agree within a percent difference (%D) of 10 percent.

The ICS has been analyzed at the proper frequency and all ICSAB solution percent recovery values fell within the control limit.

3.3.2 Atomic Absorption Calibrations

Duplicate injections are required for all GFAA analyses. The duplicate injections establish the precision of the individual analytical determinations. For sample concentrations greater than the CRDL, duplicate injections must agree within ± 20 percent RSD.

All duplicate injection quality control requirements were acceptable.

3.4 BLANKS

Samples with digestate concentrations (in ug/L) of less than five times ($< 5x$) the highest amount found in any of the associated blanks have had their associated values qualified as

non-detected (U). Samples with concentrations of greater than five times (>5x) the highest amount found in any of the associated blanks do not require qualification.

All laboratory blank results were acceptable.

3.5 ACCURACY

3.5.1 Matrix Spike Recovery

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations. Matrix spike recoveries must generally fall within the range of 75 to 125 percent.

All matrix spike recovery results were acceptable.

3.5.2 Laboratory Control Sample Recovery

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be digested or distilled and analyzed with every group of samples which have been prepared together. The performance criteria for solid LCS samples are established through interlaboratory studies coordinated by a certifying agency (e.g., EPA or an independent commercial supplier).

One solid LCS was digested and analyzed for each of the cases in this report that contained soil samples. The results were compared against the control windows established by the laboratory and were found to be acceptable.

One liquid LCS was digested and analyzed for each of the cases in this report that contained water samples. The results were compared against the control limit of 80-120% percent as required by the USEPA CLP SOW 3/90 protocol and found to be acceptable.

3.6 PRECISION

3.6.1 Laboratory Duplicate Samples

The laboratory duplicate results measures the precision of the method by measuring a second aliquot of the sample that is treated the same way as the original.

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All laboratory duplicate sample recovery results were found to be acceptable.

3.6.2 ICP Serial Dilution

The ICP serial dilution is used to determine whether significant physical or chemical interferences exist due to sample matrix. If sample concentration is ≥ 50 times the IDL for an analyte and the %D is outside the control limits the associated data must be qualified.

All ICP serial dilution results were acceptable.

3.7 FURNACE AA QUALITY CONTROL

The post-digestion analytical spike is analyzed to determine the extent of interference in the digestate matrix. When the results of the analytical spike analyses exceeds the control window of 85 to 115 percent recovery and the absorbance of the sample is greater than fifty percent of the analytical spike absorbance, then the sample must be reanalyzed using the MSA. The duplicate injections and the analytical spike recoveries establish the precision and accuracy of the individual GFAA determinations.

3.7.1 Duplicate Injections

All duplicate injection quality control requirements were met.

3.7.2 Analytical Spike Recoveries

For all samples whose analytical spike results were outside the 85 to 115 percent control limit, but whose absorbances are less than 50 percent of the analytical spike absorbance, the samples were flagged as an estimate (UJ).

The analytical spike recovery fell outside the QC limits and were flagged as estimates for the following analytes:

- Selenium in sample number B00ZM6 in SDG No. B00ZM6.
- Thallium in sample number B00ZM7 in SDG No. B00ZM6 and sample number B01607 in SDG No. B01605.
- Arsenic in sample number B01607 in SDG B01605.

3.8 ANALYTE QUANTITATION AND DETECTION LIMITS

Twenty percent of sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors.

The reviewer verified that the results and detection limits fell within the linear range of the instrument.

3.9 OVERALL ASSESSMENT AND SUMMARY

All samples were analyzed and reported under the 1990 CLP protocol (EPA 1990). In general, only the reported results for mercury were flagged "J", due to a holding time problem. The analytical spike results for selenium in sample number B00ZM6 in SDG No. B00ZM6, thallium in sample number B00ZM7 in SDG No. B00ZM6 and sample number B01607 in SDG No. B01605 and arsenic in sample number B01607 in SDG No. B01605. These results should be considered estimates only; usable only for decision-making purposes where a concentration range will suffice. All remaining results are considered to be usable for all purposes.

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INORGANIC ANALYSIS, WATER MATRIX, (µg/L)

Page 1 of 1

Project: WESTINGHOUSE-HANFORD																			
Laboratory: TMA																			
Case		SDG: B01605																	
Sample Number		B01605		B01606		B01607		B01608		B01609									
Location		1607-H-2		1607-H-2		1607-H-2		1607-H-2		1607-H-2									
Remarks																			
Sample Date		06/25/91		06/25/91		06/25/91		06/25/91		06/25/91									
Inorganic Analytes	CRQL	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Aluminum	200	10.0	U	43.80		18.9		10.8		10.0	U								
Antimony	60	11.0	U	11.0	U	11.0	U	14.7		11.0	U								
Arsenic	10	4.0	U	4.0	U	4.0	UJ	4.0	U	4.0	U								
Barium	200	1.0	U	1.2		25.2		25.5		1.0	U								
Beryllium	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U								
Cadmium	5	1.0	U	1.0	U	1.0	U	1.0	U	1.0	U								
Calcium	5000	7.0	U	181		19300		20000		7.0	U								
Chromium	10	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U								
Cobalt	50	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U								
Copper	25	3.0	U	3.0	U	3.0	U	3.0	U	3.0	U								
Iron	100	7.0	U	7.0	U	7.0	U	7.0	U	7.0	U								
Lead	3	1.0	U	1.5		1.0	U	1.0	U	1.0	U								
Magnesium	5000	13.0	U	13.0	U	222		245		13.0	U								
Manganese	15	1.0	U	1.0	U	1.0	U	1.0		1.0	U								
Mercury	0.20	0.20	UJ	0.20	UJ	0.20	UJ	0.20	UJ	0.26	J								
Nickel	40	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U								
Potassium	5000	42.0	U	42.0	U	45900		47000		42.0	U								
Selenium	5	4.0	U	4.0	U	4.0	U	4.0	U	4.0	U								
Silver	10	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U								
Sodium	5000	22.0	U	143		132000		134000		78.2									
Thallium	10	3.0	U	3.0	U	15.0	UJ	15.0	U	3.0	U								
Vanadium	50	2.0	U	2.0	U	2.0	U	2.0	U	2.0	U								
Zinc	20	3.0	U	3.0	U	3.0	U	4.3		3.0	U								
Cyanide	10	N/A		N/A		N/A		N/A		N/A									

3-9

WHC-SD-EN-TI-080, Rev. 0

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HOLDING TIME SUMMARY

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WELL AND SAMPLE INFORMATION				SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	WET CHEMISTRY
1607-H-2	B00ZM6	W	6/25/91	4-4
	B00ZM7	W	6/25/91	4-4
	B01605	W	6/25/91	4-7
	B01606	W	6/25/91	4-7
	B01607	W	6/25/91	4-7
	B01608	W	6/25/91	4-7
	B01609	W	6/25/91	4-7

4.0 WET CHEMISTRY DATA VALIDATION

4.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Raw data for the pH and conductivity determinations were not submitted for either data package. All associated data for pH and conductivity were rejected and flagged "R". Internal-chain-of-custody forms were not present for any of the samples in this report; however this did not affect the quality of the data in any way.

4.2 HOLDING TIMES

Analytical holding times for nitrate, nitrite, fluoride, chloride, phosphate and sulfate were assessed to ascertain whether the holding time requirements were met by the laboratory. The holding time requirements are as follows: twenty-eight days for nitrate, nitrite, fluoride, chloride, phosphate and sulfate solid samples, and 48 hours for nitrate, nitrite, phosphate and specific conductance aqueous samples under the USEPA SW846 protocol.

Holding times were grossly exceeded for pH in SDG No. B00ZM6 and all associated results were rejected ("R").

All other holding time requirements were met.

4.3 CALIBRATIONS

All associated instruments were calibrated using the proper standards and procedures.

4.3.1 Initial Calibration

The following calibrations procedures must be conducted:

- At least a blank and three standards were used to establish the ion chromatography, ion selective electrode, spectrophotometer, TOC analyzer and TOX analyzer

calibrations prior to sample analysis and the correlation was ≥ 0.995

- The titrant normality for alkalinity analysis was checked.

All initial calibration results were acceptable.

4.3.2 Continuing Calibration Verification

All CCV standards must be analyzed with the required frequency or every 20 samples. The percent recoveries must fall within the 90-110% acceptance windows.

All continuing calibration results were acceptable.

4.4 BLANKS

One laboratory preparation blank is analyzed at a frequency of one every 20 samples. All blank results must fall below the CRQL and if not, all associated data <5 times the amount found in the blank is qualified as non-detected "U".

Samples specifically designated as laboratory blanks were not provided in the data packages; however, this does not affect the quality of the data.

4.5 ACCURACY

4.5.1 Matrix Spike Recovery

Matrix spike analyses are used to assess the analytical accuracy of the reported data and the effect of the matrix on the ability to accurately quantify sample concentrations.

All matrix spike results were acceptable.

4.5.2 Laboratory Control Sample Recovery

The LCS monitors the overall performance of the analysis, including the sample preparation. An LCS should be prepared (e.g., digested or distilled) and analyzed with every group of samples which have been prepared together. The performance criteria for aqueous LCS percent recovery is 80 to 120 percent. The performance criteria for solid LCS samples are established through interlaboratory studies coordinated by a certifying agency (e.g., EPA or an independent commercial supplier).

Samples specifically designated as laboratory control samples were not provided in the data packages; however, this does not affect the quality of the data.

4.6 PRECISION

Analytical duplicate sample analyses are used to measure laboratory precision and sample homogeneity. Field duplicate analyses are used to measure both the laboratory and the field sampling procedure precision.

All duplicate analyses results were acceptable for this report.

4.7 ANALYTE QUANTITATION AND DETECTION LIMITS

Sample results and reported detection limits were recalculated to ensure that the reported results were accurate. Raw data were examined for anomalies, transcription errors, and reduction errors. In addition, the reviewer verified that the results fell within the linear range of the instrument.

4.8 OVERALL ASSESSMENT AND SUMMARY

A review of instrument continuing calibration information and QC data indicate that instrument performance was adequate for these analyses. The holding times for pH were grossly exceeded for all samples associated with SDG No. B00ZM6. The results were rejected and flagged "R". The raw data for pH and conductivity were not submitted, therefore, all associated results were rejected and flagged "R". ICV and CCV forms were not provided for this report, however the analysis of these samples met QC requirements. All other results are acceptable and usable for all purposes.

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HOLDING TIME SUMMARY

[illegible]

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WELL AND SAMPLE INFORMATION				SAMPLE LOCATION INFORMATION
SAMPLE LOCATION	SAMPLE NUMBER	MATRIX	DATE SAMPLED	RADIOCHEMISTRY
1607-H-2	B00ZM6	W	6/25/91	12-3
	B00ZM7	W	6/25/91	12-3
	B01605	W	6/25/91	12-4
	B01606	W	6/25/91	12-4
	B01607	W	6/25/91	12-4
	B01608	W	6/25/91	12-4
	B01609	W	6/25/91	12-4

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5.0 GROSS ALPHA AND GROSS BETA DETERMINATION DATA VALIDATION

5.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all gross alpha and gross beta results in both data packages have been rejected ("R").

5.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

5.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the gas proportional counter used for gross alpha and gross beta determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination as a function of alpha or beta particle energy, and as a function of the mass of material submitted for counting. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All gross alpha sample results in all data packages were rejected and flagged "R" because efficiencies were below the QC minimum of 20%.

All gross alpha and gross beta sample results were rejected and flagged "R" because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

5.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of alpha or beta emitting radionuclides. The sample activity as determined by sample analysis is compared to the known activity to assess accuracy. Acceptable accuracy of spiked sample data must fall within a range of 80 to 120 percent. If spiked sample results were outside this range, the associated data was qualified as estimated (J/UJ).

All gross alpha and gross beta sample results were rejected and flagged "R" since the appropriate laboratory control sample data (or matrix spike analyses) were not furnished.

5.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with activities greater than five times the LLD and with an RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected and flagged "R".

5.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

5.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitation and detection limits were recalculated for all samples in each data package (SDG No.) to verify their accuracy.

All compound quantitation and reported detection limits for all samples are acceptable.

5.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of instrument continuing calibration information and QC data cannot be made due to missing QC and calibration data. As noted in the previous sections, all gross alpha data in each SDG were rejected because efficiencies determined in calibration were less than the QC minimum of 20%. Rejected data are unusable for all purposes.

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18017-2 18017

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6.0 ALPHA SPECTROSCOPY DATA VALIDATION

6.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all alpha spectroscopy results in both data packages have been rejected ("R").

6.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

Holding times were acceptable for all samples.

6.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the alpha spectroscopy system used is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for each alpha radionuclide region of interest and system resolution as measured by the full-width at half maximum for each peak. Initial calibration was performed for each counting geometry used during the analysis of Westinghouse Hanford samples. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All alpha spectroscopy sample results were rejected ("R") because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

6.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of alpha emitting radionuclides. The sample activity as determined by sample

analysis is compared to the known activity to assess accuracy. The acceptable matrix spike or Laboratory Control Sample recovery range is 80 to 120 percent, while that for radiometric yields is 30 to 105%. Spike sample results outside the above ranges resulted in qualification of the associated data as estimated (J/UJ).

All alpha spectroscopy sample results were rejected ("R") since the appropriate laboratory control sample data (or matrix spike analyses) were not furnished.

Due to low radiometric yields in sample number B01605 in SDG No. B01605, the associated uranium results were rejected ("R").

Due to low radiometric yields in sample number B01606 in SDG No. B01605, the associated plutonium results were rejected ("R").

6.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate samples. Replicates with a RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected ("R").

6.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results are due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

6.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitations and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. Results below the MDA were qualified as non-detects (U) except in cases where the MDA was greater than the contract required detection limit. In the latter situation, non-detects were qualified as estimated (UJ).

All compound quantitation and reported detection limits are acceptable.

6.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of the system performance is not possible due to missing calibration and QC data. All results were rejected ("R") because of the above deficiency. In addition, two samples in SDG No. B01605 were rejected for Plutonium and Uranium due to low radiometric yields. Rejected results are unusable for all purposes.

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7.0 GAMMA SPECTROSCOPY DATA VALIDATION

7.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all gamma spectroscopy results in both data packages have been rejected ("R").

7.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

7.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the gamma spectroscopy system used is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturers recommendations and consists of an instrument efficiency determination for each gamma radionuclide region of interest, system resolution, as measured by the full-width at half maximum for each peak. Initial calibration was performed for each counting geometry used during the analysis of Westinghouse Hanford samples. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All gamma spectroscopy sample results were rejected ("R") because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

7.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of gamma emitting radionuclides. The sample activity as determined by sample

analysis is compared to the known activity to assess accuracy. The acceptable spiked recovery range is 80 to 120 percent. If spiked sample results were outside this range the associated data was qualified as estimated (J/UJ).

All gamma spectroscopy sample results were rejected ("R") since the appropriate laboratory control sample data (or matrix spike analyses) were not furnished.

7.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected ("R").

7.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank sample results were acceptable.

7.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitations and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. Results below the MDA were qualified as non-detects (U) except in cases where the MDA was greater than the contract required detection limit. In these situations, non-detects were qualified as estimated (UJ).

All compound quantitation and detection limits and results are reported properly.

7.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of system performance is not possible due to missing calibration and QC data. The associated sample results

were rejected ("R"). Rejected data is unusable for all purposes and should not be reported.

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8.0 STRONTIUM-90 DETERMINATION DATA VALIDATION

8.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6

B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all Strontium-90 results in both data packages have been rejected ("R").

8.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

8.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background counting system used for Strontium-90 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument detection efficiency determination. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All Strontium-90 sample results were rejected ("R") because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

8.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiotraced samples should show a radiometric yield or recovery between 30 and 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated.

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All Strontium-90 sample results were rejected ("R") since the appropriate laboratory control sample data (or matrix spike analyses) were not furnished.

8.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with an RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected ("R").

8.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

8.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. Results below the MDA were qualified as non-detects (U) except in cases where the MDA is greater than the contract required detection limit. In these situations, non-detects were qualified as estimated (UJ).

All compound quantitation and reported detection limits and sample results have been properly reported and transcribed.

8.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of system performance for these analyses is not possible due to missing QC and calibration data. All sample data has been rejected ("R") for this reason. Rejected data is unusable for all purposes and should not be reported.

9.0 NICKEL-63 DETERMINATION DATA VALIDATION

9.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all Nickel-63 results in both data packages have been rejected ("R").

9.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

9.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the liquid scintillation counting system used for Nickel-63 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument detection efficiency determination. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All Nickel-63 sample results were rejected ("R") because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

9.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiotraced samples should show a radiometric yield or recovery between 30 and 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated.

All Nickel-63 sample results were rejected ("R") in SDG No. B01605 since the appropriate laboratory control sample data (or matrix spike analyses) were not furnished

All other accuracy results are acceptable.

9.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with an RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected ("R").

9.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

9.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. Results below the MDA were qualified as non-detects (U) except in cases where the MDA is greater than the contract required detection limit. In these situations, non-detects were qualified as estimated (UJ).

All compound quantitation and reported detection limits and sample results have been properly reported and transcribed.

9.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of system performance is not possible due to missing QC and calibration data. All associated sample data has been rejected ("R"). Rejected data is unusable for all purposes and should not be reported.

10.0 TECHNETIUM-99 DATA VALIDATION

10.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all Technetium-99 results in SDG No. B01605 have been rejected ("R").

All other packages were found to be complete.

10.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

10.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low level beta counting system used is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturers recommendations and consists of an instrument efficiency determination and a self-absorption curve for the radionuclide of interest. In addition, the detection method employs a National Technical Information System (NTIS) traceable Technetium-99m internal reference standard. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All Technetium-99 sample results in SDG No. B01605 were rejected ("R") because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

All other calibration results were acceptable.

10.4 ACCURACY

Accuracy was evaluated by analyzing soil or distilled water samples spiked with known amounts of Technetium-99, a gamma emitting radionuclide. The sample activity as determined by sample analysis is compared to the known activity to assess accuracy. Acceptable accuracy of spiked sample data must fall within a range of 80 to 120 percent, while radiotraced yields and recoveries must fall between 30 and 105%. Spike sample results outside the above ranges resulted in qualification of the associated data as estimated (J/UJ).

All Technetium-99 sample results were rejected ("R") in SDG No. B01605 since the appropriate laboratory control sample data (or matrix spike analyses) were not furnished.

Accuracy results for all other samples were acceptable.

10.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected ("R").

10.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results were acceptable.

10.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitations and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. Results below the MDA were qualified as non-detects (U) except in cases where the MDA was greater than the contract required detection limit. In these cases, non-detects were qualified as estimated (UJ).

All compound quantitation and reported detection limits have been properly calculated and reported for the sample analyses at hand.

10.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of QC and calibration data indicates that system performance is adequate for these analyses. Due to missing duplicate data, all sample results have been qualified as estimated (J/UJ). Data qualified in this manner is valid and usable for limited purposes only.

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11.0 CARBON-14 DETERMINATION DATA VALIDATION

11.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all Carbon-14 results in both data packages have been rejected ("R").

11.2 HOLDING TIMES

Holding times for Carbon-14 liquid scintillation analyses were assessed to ascertain whether the holding time requirements were met by the laboratory. Samples must be analyzed within six months of collection.

All holding times were acceptable.

11.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background liquid scintillation counting system used for Carbon-14 determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination for the radionuclide at hand. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All Carbon-14 sample results were rejected ("R") because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

11.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiometric yields should fall within the range of 30 to 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated (J/UJ).

All Carbon-14 sample results were rejected ("R") in SDG No. B01605 since the appropriate laboratory control sample data (or matrix spike analyses) were not furnished.

All other accuracy results were acceptable.

11.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected ("R").

11.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank results are acceptable.

11.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. Results below the MDA were qualified as non-detects (U) except in cases where the MDA was greater than the contract required detection limit. In these situations, non-detects were qualified as estimated (UJ).

All compound quantitation and reported detection limits and sample results have been properly reported and transcribed.

11.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of system performance is not possible due to missing calibration and QC data. The associated sample results were rejected ("R"). Rejected data is unusable for all purposes and should not be reported.

12.0 TRITIUM DETERMINATION DATA VALIDATION

12.1 DATA PACKAGE COMPLETENESS

The following data packages (SDG Nos.) were submitted:

B00ZM6 B01605

Since the appropriate QC (LCS and duplicate) and calibration data were not submitted with the associated sample data, all tritium results in both data packages have been rejected ("R").

12.2 HOLDING TIMES

Holding times are calculated from Chain-of-Custody forms to determine the validity of the results. The maximum holding time for this analysis is six months.

All holding times were acceptable.

12.3 INSTRUMENT CALIBRATION AND PERFORMANCE

Instrument calibration is performed to establish that the low background liquid scintillation counting system used for tritium determination is capable of producing acceptable and reliable analytical data. The initial calibration was performed according to manufacturer's recommendations and consists of an instrument efficiency determination, and background tritium measurements for uncontaminated water. Continuing calibration checks are performed to verify that instrument performance is stable and reproducible on a day-to-day basis.

All Tritium sample results were rejected ("R") because the appropriate primary calibration reference sheets and instrument background/efficiency logs were not submitted.

12.4 ACCURACY

All spike recoveries should be within the specified QC range of 80 to 120 percent, while all radiometric yields should fall within the range of 30 to 105%. Spiked sample results outside the above ranges resulted in qualification of the associated data as estimated (J/UJ).

All accuracy results were acceptable.

12.5 PRECISION

Analytical precision is expressed by the RPD between the recoveries of duplicate matrix spike analyses performed on a sample. When the laboratory has not performed duplicate spike analyses, precision may also be assessed using unspiked duplicate sample analyses. Replicates with a RPD less than 35 percent are acceptable. If duplicate activities are both $<5 \times \text{LLD}$, a control limit of $2 \times \text{LLD}$ is used. If replicate values are both below the LLD, no control limit is applicable. If the RPD is outside the applicable control limit, associated results are qualified as estimated detects (J) or estimated non-detects (UJ).

Due to lack of duplicate data, all sample results have been rejected ("R").

12.6 BLANK SAMPLES

Blank samples are analyzed to determine if positive results may be due to laboratory reagent, sample container, or detector contamination.

All blank data results were acceptable.

12.7 COMPOUND QUANTITATION AND REPORTED DETECTION LIMITS

Compound quantitation and detection limits were recalculated for all samples in each data delivery package to verify their accuracy. Results below the MDA were qualified as non-detects (U) except in cases where the MDA was greater than the contract required detection limit. In these situations, non-detects were qualified as estimated (UJ).

All compound quantitation and reported detection limits and sample results have been properly reported and transcribed.

12.8 OVERALL ASSESSMENT AND SUMMARY

A complete review of system performance is not possible due to missing calibration and QC data. The associated sample results were rejected ("R"). Rejected data is unusable for all purposes and should not be reported.

9 3 1 2 9 7 0 0 0 5 2

RADIOCHEMISTRY ANALYSIS, SOIL MATRIX, (pCi/g +- 2)

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Project WESTINGHOUSE-HANFORD																				
Laboratory TMA																				
Case	SDG		B00ZM6																	
Sample Number	B00ZM6		B00ZM7																	
Location	1607-H-2		1607-H-2																	
Remarks																				
Sample Date	6/25/91		6/25/91																	
Analysis Date	10/30/91		10/30/91																	
Radiochemical Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	15	R	2	R																
Gross Beta	18	R	21	R																
Tritium	200	R	200	R																
Carbon-14	30	R	25	R																
Nickel-63	7	R	5	R																
Strontium-90	0.79	R	0.7	R																
Technetium-99	0.6	UJ	0.4	UJ																
Uranium-233/234	3.3	R	5.8	R																
Uranium-235	0.17	R	0.28	R																
Uranium-238	2.6	R	4.4	R																
Plutonium-238	0.07	R	0.05	R																
Plutonium-239/240	0.09	R	0.11	R																
Plutonium-241	9	R	6	R																
Americium-241	0.038	R	0.09	R																
Potassium-40	7.027	R	8.053	R																
Cobalt-60	0.48	R	1.379	R																
Cesium-137	0.871	R	0.745	R																
Radium-226	0.6807	R	1.362	R																
Thorium-228	0.8610	R	0.9115	R																
Thorium-232	1.429	R	2.041	R																
Europium-152	0.9524	R	1.122	R																

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RADIOCHEMISTRY ANALYSIS, WATER MATRIX, (pCi/L +- 2)

Page 1 of 1

Project WESTINGHOUSE-HANFORD																
Laboratory TMA																
Case	SDG		B01605													
Sample Number	B01605		B01606		B01607		B01608		B01609							
Location	1607-H-2		1607-H-2		1607-H-2		1607-H-2		1607-H-2							
Remarks																
Sample Date	6/25/91		6/25/91		6/25/91		6/25/91		6/25/91							
Analysis Date	9/24/91		9/24/91		9/24/91		9/24/91		9/24/91							
Radiocemical Analysis	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q	Result	Q
Gross Alpha	0	R	2	R	4	R	2	R	0	R						
Gross Beta	0	R	0	R	21	R	22	R	1	R						
Tritium	180	R	180	R	224	R	310	R	169	R						
Carbon-14	35	R	31	R	50	R	32	R	35	R						
Nickel-63	9	R	9	R	9	R	10	R	10	R						
Strontium-90	0.5	R	0.5	R	0.6	R	1.4	R	0.5	R						
Technetium-99	11.2	R	12.4	R	12.4	R	13.8	R	13.4	R						
Uranium-233/234	0.3	R	0.1	R	1.8	R	1.7	R	0.3	R						
Uranium-235	0.2	R	0.1	R	0.1	R	0.2	R	0.1	R						
Uranium-238	0.1	R	0.1	R	1.7	R	1.5	R	0.2	R						
Plutonium-238	0.2	R	0.1	R	0.1	R	0.1	R	0.1	R						
Plutonium-239/240	0.1	R	0.1	R	0.1	R	0.1	R	0.1	R						
Plutonium-241	7	R	8	R	23	R	9	R	13	R						
Americium-241	0.1	R	0.2	R	0.1	R	0.1	R	0.2	R						
Potassium-40	133	R	253	R	174	R	69	R	215	R						
Cesium-137	10	R	14	R	11	R	6.3	R	12	R						
Radium-226	24	R	35	R	28	R	21	R	20	R						
Thorium-228	19	R	23	R	22	R	13	R	18	R						
Thorium-232	45	R	57	R	53	R	34	R	55	R						

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13.0 REFERENCES

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Date Received: <u>2-22-93</u>		INFORMATION RELEASE REQUEST		Reference: <u>WHC-CM-3-4</u>																																																							
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New or novel (patentable) subject matter? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If "Yes", has disclosure been submitted by WHC or other company? <input type="checkbox"/> No <input type="checkbox"/> Yes Disclosure No(s).				Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes (Identify)																																																							
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Information conforms to all applicable requirements. The above information is certified to be correct.																																																											
References Available to Intended Audience <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Transmit to DOE-HQ/Office of Scientific and Technical Information <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			INFORMATION RELEASE ADMINISTRATION APPROVAL STAMP Stamp is required before release. Release is contingent upon resolution of mandatory comments. <div style="border: 2px solid black; border-radius: 50%; padding: 10px; margin: 10px auto; width: 150px; text-align: center;"> APPROVED FOR RELEASE OFFICIAL <div style="border: 1px solid black; padding: 2px; display: inline-block;">NS</div> DOCUMENT 2/24/93 </div>																																																								
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